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constatées sur des Ossements de Mammifères Fossiles des Environs de Chartres. (Extr. des Compt. Rend. de l'Académie des Sciences. T. 56. Seance du 29. Juin, 1863.) 4to pamph. Paris. 1863.

Henri de Saussure.

Études sur le Métamorphisme des Roches, par M. Delesse. Tiré de la Bibliotheque Universelle et Revue Suisse [Archives des Sciences Phys. et Nat.] livr. d'Avr. 1863. T. XVI. 8vo pamph.

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Ephemeriden der seit 1845 entdeckten Planeten für das Jahr 1864. Supplement zu dem Berliner Jahrbuch für 1866. 8vo vol. Berlin. 1864.

T. C. Winkler.

Musée Teyler. Catalogue Systématique de la Collection Paléontologique. 1st Part. 8vo pamph. Harlem. 1863.

Prof. C. Hansteen.

Magnetiske Jagttagelser paa Island og Spitsbergen. 8vo pamph. Christiania.

Resultate Magnetischer, Astronomischer, und Meteorologischer Beobachtungen auf einer Reise nach dem Oestlichen Sibirien, in den Jahren 1828 – 30. 4to vol. Christiania. 1863.

Five hundred and thirty-seventh Meeting.

August 10, 1864. — STATUTE MEETING.

The PRESIDENT in the chair.

The President read letters from Mr. R. W. Emerson and Dr. J. B. Upham, in acknowledgment of their election into the Academy.

The following paper was presented by the President: —

Synopsis of North American Gaurineæ. By J. T. ROTHROCK.

IN an examination of *Gaura coccinea*, I noticed an appendage at the base of each filament, and an indusium surrounding the stigma. Both these characters appearing to us at the time not to have been observed before, at the suggestion of Professor Gray I undertook to see how far they could be turned to account in the classification of

Gaura and its near allies. While so engaged, I found that Linnæus had noticed these appendages at least as early as in the fifth edition of his *Genera Plantarum.*[*] It is probable that they were mentioned in his paper in the *Acta Holmiensia,* in which he established the genus. With the exception of Jussieu,[†] subsequent authors seem to have lost sight of them.

These appendages are present in all the species of *Gaura* (though in *G. parviflora* reduced to a minimum); but are wanting in *Stenosiphon* and the *G. heterandra* of Torrey. On account of this and other differences, I have been led to propose the latter as the type of a new genus (*Heterogaura*).

The nearest analogue to these appendages with which I am acquainted will be found in many of the *Zygophyllaceæ,* — *Larrea,* for example, — where they are much more developed, and are almost as long as the filament. From their position, it may be inferred that they do not represent an additional set of stamens, but are part of the filament to which they are attached. If the hypothesis of chorisis be admitted, they may be regarded as fine examples of it, either of *vertical* chorisis, if their position before the filament be taken as normal; or of *collateral,* if (as the notch at their apex sometimes may indicate) they be considered as homologous with a pair of stipules. I have never been able to find such appendages on the inside of any broad-based filaments.

Though the presence or absence of the appendages is a good generic character in *Gaurineæ,* they are much too variable to serve for limiting species, except in *G. parviflora,* where they are reduced to mere papillæ, and in *G. Drummondii,* which has those of the filaments opposite the petals decidedly shorter than the others.

As to the indusium or ring surrounding the base of the stigma, in the same genus, I found that this also had been noticed before, or at least represented. That is, it had been figured in Payer's *Organogenie Végétale* (tab. 150, f. 34 – 36), in young flower-buds of *G. biennis ;* but there is no reference to the subject in the letter-press.

It is clearly of the same nature as the indusium in *Ericaceæ,* noticed by Robert Brown, in which, as Mr. Bennett remarks, the likeness to the more strongly developed one of *Goodenovieæ* is too obvious to escape attention.* In several species of *Gaura*, the whole structure is strikingly like that of *Epigæa repens*, i. e. with the four (in *Epigæa* five) lobes of a manifest indusium adnate to the under side of each projecting stigma. Sometimes, as in *G. villosa* and *G. tripetala*, the lobes of the indusium are confluent with or firmly adherent throughout to their stigmas. In others, as *G. Lindheimeri*, the lobes are free at the summit, or soon become so, or may easily be separated down to their base. In *G. coccinea*, the annular or crateriform indusium is quite entire and mainly free; in *G. longiflora*, nearly so; in *G. sinuata*, slightly four-lobed. In *G. parviflora* alone, the stigmas are scarcely exserted beyond the indusium.

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[*] " Glandula nectarifera conica intra basin singuli." — *Linn. Gen. Plant.* Ed. 5 (1754).

[†] " Glandulas 8 in *G. bienni* memorat Linnæus summo calici adnatas." — *Juss. Gen. Plant.*

Probably the indusium may in some instances furnish good characters; but they are difficult to fix in dried specimens, and vary somewhat during and after anthesis. *G. Lindheimeri* is the only species of which I can at this season examine the live plant.

In *Stenosiphon*, the indusium is peltate and nearly entire, but (in the dried specimens) more or less plicate or intruded between the stigmas, so as partly to enwrap their bases. In *Gaura heterandra*, Torr., there appears to be no indusium: at least, if there is anything answering to such an organ, it is so completely confluent with the entire and disk-shaped proper stigma that it is not at all discernible. This, added to the total want of appendages on the base of the filament, as already remarked, strengthens the conviction that this anomalous plant is a new generic type, much more distinct from *Gaura*, indeed, than *Stenosiphon* is. The habit of the plant, which is rather that of *Clarkia*, and the equally spreading instead of the declined stamens, confirm this view.

The three genera of the group (*Schizocarya*, Spach, and apparently his *Gauridium*, not differing from *Gaura*) may be contrasted as follows.

Subtribus GAURINEÆ, Spach.

Calyx tubo supra ovarium producto, post anthesin deciduo. Stamina duplo petalorum numero. Ovarium (4–3-, rarissime 6-) ovulatum. Fructus nucamentaceus, abortu 1–4-spermus.

1. GAURA, L. Calycis tubus obconicus vel elongato-clavatus.

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* Plantæ Javanicæ Rariores, 1. p. 86.

Stamina conformia, declinata: filamenta basi intus appendice squamæformi aucta: antheræ sæpissime lineari-oblongæ. Stigma quadripartitum, indusio vel adnato vel fere libero cinctum. Ovarium 4- (quandoque 3-) loculare, loculis 1- (in alternis raro 2-) ovulatis. Fructus dissepimentis evanidis unilocularis.

2. STENOSIPHON, Spach. Calycis tubus filiformis. Stamina conformia, declinata: antheræ ovales, medio affixæ; filamenta tenuissima, exappendiculata. Stigma quadripartitum, indusio peltato basi loborum adnato (inter lobos pl. m. involuto) suffultum. Ovarium (dissepimentis nullis) uniloculare, 4-ovulatum. Fructus abortu monospermus.

3. HETEROGAURA, nov. gen. Calycis tubus brevis, obconicus. Stamina erecta, 4 petalis alterna fertilia antheris ovato-cordatis; 4 petalis opposita fere ananthera breviora: filamenta exappendiculata. Stigma disciforme, integrum: indusium nullum. Ovarium 4-loculare, loculis uniovulatis. Fructus obovato-gibbosus, 2–4-locularis, abortu mono- (vel di?-) spermus. Vide infra.

Respecting *Stenosiphon* (still of a single species), I have nothing to add. The species of *Gaura* I have endeavored to define mainly by the flower and fruit. As to the latter, it must be remarked that only the mature or nearly mature fruit is of much account in distinguishing the species; and in the following characters the ripe fruit is to be understood as in view, except where it is otherwise specified. The young or forming fruit is quite too variable.

The characters of our species derived from the fruit may be briefly presented in the following tabular key.

Fructus sessilis vel subsessilis (i. e. flores spicata):
usque ad basim tetraqueter, quandoque triqueter,
pyramidatus, glaber, angulis acutissimis, faciebus in sicco plus minus corrugatis. G. TRIPETALA, G. SUFFULTA.
oblongus, glaber, lævis, angulis acutissimis. G. LINDHEIMERI.
oblongus seu ovatus, pubens vel puberulus,
acutissime angulatus, utrinque acutus. G. ANGUSTIFOLIA.
obtusiuscule angulatus, subcanescens, parvus. G. LONGIFLORA.
obtusiuscule angulatus, velutino pubescens (3–4 lin-longus). G. BIENNIS.
basi teretiuscula sensim brevè attenuatus, superne obtusangulus. G. PARVIFLORA.
infra medium in collum teres subito contractus, superne pyramidatus,
canescens, collo crasso. G. DRUMMONDII.
glaber, collo tenui. G. COCCINEA.

Fructus manifeste in pedicellum clavato-attenuatus vel contractus:
  parvus, parte seminifera (1½ lin.) ovato-pyramidata obtusissima. G. FILIPES.
  elongatus, cum pedicello semipollicaris, apice sæpius pl. m. attenuatus,
    tetraqueter, angulis acutis. G. VILLOSA.
  fusiformis, obtusangulus (maturus vero haud visus),
    cano-puberulus, costis inter angulos validis percursus. G. MACROCARPA.
    glaber, costis angulis alternantibus obsoletis. G. SINUATA.

The following synopsis is restricted to the North American species of *Gaura.* I am unable to complete the monograph by adding the few peculiar to Mexico, no specimens of these being accessible to me.

GAURÆ BOREALI-AMERICANÆ.

§ 1. *Antheræ lineares seu lineari-oblongæ (in* G. angustifolia *tantum brevi-oblongæ), supra basim affixæ; appendices filamentorum squamæformes vel subulatæ: stigmata ultra indusium exserta.*

* *Fructus sessilis vel subsessilis.*

+– *Fructus tetra- (quandoque tri-) queter, vix ac ne vix attenuatus.— Biennes vel annuæ (nunc perennes?), caulibus elongatis virgatis, bracteis caducis.*

++ *Rhachis fructu delapso haud dentata vel squarrosa, cicatricibus parvis. Fructus ad latera lævis. Appendices staminum parvæ vel parvulæ.*

1. G. LINDHEIMERI, Engelm. & Gray (Pl. Lindh., 1. p. 9): strigoso-pubescens vel hirsuta, grandiflora; calyce in albastro crinito-piloso, segmentis tubo quadruplo longioribus; stylo basi piloso; fructu oblongo acutato glabro, angulis acutissimis, faciebus usque ad medium acute unicostatis. — Texas. — Petals nearly an inch long.

2. G. BIENNIS, L. Caule villoso-pubescente; calycis segmentis tubum adæquantibus, fauce cum basi styli leviter pilosa; fructu velutino-pubescente basi obtusangulo inter angulos usque ad apicem unicostato. — Canada to Georgia, and Missouri to Texas.

3. G. LONGIFLORA, Spach? (Monogr. Onagr. p. 60): molliter subcinereo-puberula; ramis gracilibus; calycis segmentis tubo duplo longioribus; stylo basi glabella; fructu parvo ovoideo vel obovoideo canescenti-puberulo obtusiuscule angulato. — Texas to Louisiana (Drummond) and Mississippi (Dr. Crockett). — A tall species, like *G. biennis.* Flowers larger than in the following species, but fruit much smaller, only 1½ to 2 lines long. It in no wise deserves the name

of *longiflora*, and perhaps is not the plant which Spach imperfectly characterized. That is said to have the tube of its calyx four lines long, but the anthers only half a line long: the present plant has the former rather shorter, and the latter much longer. I retain the specific name, since it was taken up in *Plantæ Lindheimerianæ:* if incorrect, *microcarpa* would be the most characteristic name.

4. G. ANGUSTIFOLIA, Michx. Pilosiuscula vel glabrata, gracilis; foliis repandis sæpe undulatis; calycis segmentis, tubum adæquantibus; *antheris brevi-oblongis;* stylo basi glabro; fructu puberulo ovato oblongo acutissime 3-4-angulato basi breviter attenuato, faciebus usque ad medium unicostatis. — North Carolina to Florida and Louisiana. — Petals not more than two lines long. Flowers frequently trimerous, the fruit (three lines long) then triquetrous.

++ ++ *Rhachis fructu delapso cicatricibus (seu pedicillis brevissimis adnatis) prominulis cupuliformibus squarrosa. Fructus pyramidatus ad latera pl. m. corrugatus. Appendices staminum majusculi.*

5. G. SUFFULTA, Engelm. (in Gray, Pl. Lindh. 2. p. 190). Caule hirsuto; foliis inferioribus sæpe sinuato-pinnatifidis; stylo basi subglabro indusio quadripartito superne a stigmate libero; fructu ovato pyramidato acutissime tetraquetro, faciebus concavis parce corrugatis costa gracili percursis. — Texas. — Flowers rarely trimerous.

6. G. TRIPETALA, Cav. (Gray, Pl. Wright. 1. p. 72). Caule gracili hirsuto; indusio stigmatis prorsus adnato; fructu pyramidato acutissime triquetro, faciebus parum concavis valde rugosis costa superne demum evanida percursis. — *G. triangulata*, Buckley, Proceed. Acad. Philad., Dec. 1861. — Texas. Mexico.

+ + *Fructus (permaturus) infra medium in collum teres subito contractus, superne pyramidatus. — E radice perenni multicaules, humiles.*

7. G. COCCINEA, Nutt. Canescens, foliosissima; radice lignescente; bracteis persistentibus flores adæquantibus; calycis segmentis tubo paulo longioribus; stylo basi piloso; indusio stigmatis annulari margine integerrimo; fructu canescente inferne in collum crassum contracto. — *G. epilobioides*, H. B. K. is probably but a form of this. — Saskatchawan to Texas and Mexico.

8. G. **Drummondii**, Torr. & Gray (*Schizocarya*, Spach). Glabella vel puberula; bracteis caducis; calycis segmentis tubo duplo longioribus, fauce cum basi styli tomentosa; appendicibus staminum petalis antepositorum cæteris manifeste brevioribus; indusio stigmatis quadripartito superne libero; fructu glabro superne conico-pyramidato inferne in collum angustum pedicelliforme contracto. — Texas and New Mexico.

* * *Fructus in pedicellum manifestum clavato-attenuatus vel contractus.*

9. G. **filipes**, Spach (Monog. Onagr. p. 59). Puberula vel glabrata, habitu et foliis *G. angustifoliæ;* calycis segmentis tubo elongato clavato paulo longioribus; stylo basi subglabro; fructu parvo superne ovate-pyramidato apice obtuso basi in pedicellum clavatum contracto.— Virginia and Ohio to Florida and Arkansas. — This species is most nearly related to *G. angustifolia ;* but besides its pedicellate fruit, which makes it necessary to refer it to this section, the anthers are oblong-linear.

10. G. **sinuata**, Nutt. Glabra; caule superne nudo; foliis præsertim infimis sæpe sinuato-pinnatifidis; calycis segmentis tubo breviobconico 2–3-plo longioribus; stylo basi creberrime villoso; fructu glabro immaturo fusiformi obtusangulo, costis inter angulis obsoletis.— Arkansas and Texas.

11. G. **villosa**, Torr. Canescenti-pubescens, caule nunc villoso; calycis segmentis tubo brevissime obconico quadruplo longioribus; fructu glabro ovato-oblongo tetraquetro inter angulos acutissimos ecostato. — Texas and Arkansas. — Root truly perennial.

12. G. **macrocarpa**, sp. nov. Caulibus e radice perenni ramulisque pube hirtella scabris; foliis parvis integris margine hispidulis; calycis segmentis tubo paulo longioribus; fructu (haud maturo) canescenti-puberulo fusiformi, obtusangulo costis validis inter angulos percurso. — Southwestern Texas. Wright (No. 1879), Bigelow; — referred to *G. villosa* in Pl. Wrightianæ, 2. p. 59, and in Bot. Mex. Bound. Survey, No. 375.

Leaves rather thick, obtuse, with the revolute margins hispidly ciliate; lower ones 10 lines long, 1 to 2 lines wide, with one or two strong teeth on either edge; upper ones entire, and gradually reduced to bracts. Fruit and pedicel together 8 lines long, subterete, strongly 4-costate. Inflorescence racemose, or in older specimens in a contracted panicle.

§ 2. *Antheræ ovales, retusæ, medio affixæ: inflorescentia spicata, floribus minimis: stigmata ultra indusium haud vel vix producta.*

13. G. PARVIFLORA, Dougl. Caule pilis longis patentibus villoso; foliis utrinque adpresse velutinis ciliatis; indusio quadripartito, lobis basi dilatatis; fructu oblongo sessili velutino valde obtusangulo inter angulos unicostato. — Head-waters of the Platte to Louisiana and Texas. — Wallawallah, Oregon, Douglas, ex Hook. Fl. Bor.-Am.

HETEROGAURA, gen. nov.

Calycis tubus brevis, obconicus. Stamina erecta, 4 petalis alterna fertilia antheris ovato-cordatis retusis; 4 petalis opposita breviora fere ananthera, antheris abortivis lanceolato-cordatis acutissimis: filamenta clavata, exappendiculata. Stylus stamina adæquans: stigma disciforme integerrimum, indusio nullo. Ovarium 4-loculare; loculis uniovulatis. Fructus ovato-gibbosus, 2–4-locularis, abortu 1- (vel 2?-) spermus. — Herba annua, erecta, superne paniculato-ramosa. Folia subintegerrima vel parce obsolete sinuato-dentata; inferiora petiolata, lanceolata; superiora lanceolata-linearia, sessilia vel subsessilia. Ovaria (cum ramulis junioribus) puberula.

H. CALIFORNICA. *Gaura heterandra*, Torr. in Pacif. R. R. Reports, 4. p. 87. — Mokelumne Hill, California, Dr. J. M. Bigelow, May. — Plant one or two feet high, and with habit entirely different from *Gaura*, rather that of *Clarkia*.

Five hundred and thirty-eighth Meeting.

September 13, 1864. — ADJOURNED STATUTE MEETING.

The PRESIDENT in the chair.

Colonel J. D. Graham, of the Corps of Engineers, U. S. Army, in alluding to the semi-diurnal lunar tide lately discovered by him in Lake Michigan, and published in his Reports from 1858 to 1863, remarked, that while in charge as Superintendent of the Survey of the Northern and Northwestern Lakes, he had instituted a series of observations for the purpose of ascertaining, with accuracy, the extent of the similar tide in Lake Huron.